Russian Journal of Plant Physiology 2011 vol.58 N6, pages 1034-1039

Stress responses of wheat leaves to dehydration: Participation of endogenous NO and effect of sodium nitroprusside

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Abstract

Dynamics of endogenous NO in the leaves of 7-day-old seedlings of spring wheat (Triticum aestivum L., cv. Debyut) and the effect of exogenous NO donor (sodium nitroprusside, SNP) on the development of oxidative stress and activity of antioxidant enzymes in the leaves under water deficiency were investigated. Quick and phasic accumulation of NO in the leaves was observed under growing dehydration (0-3 h) and subsequent rehydration (0-3 h), which points to identical response of NO signal system to opposite changes in the water status of plants. A decrease in relative turgidity of tissues brought about accumulation of H 2O 2 and MDA therein. Protective effect of NO donor infiltrated in the leaves was associated with an elevation of ascorbate peroxidase and catalase activities and suppression of lipid peroxidation upon dehydration. Pretreatment with SNP (50-250 μM) induced the elevation of NO level in the leaves both before action of the stress agent and in the beginning (0-30 min) of dehydration. The obtained results suggest that brief increase in endogenous NO is necessary for triggering protective and adaptive responses in wheat plants during the development of water deficiency.

http://dx.doi.org/10.1134/S1021443711060033

Keywords

antioxidant enzymes, dehydration, infiltration, NO, oxidative stress, sodium nitroprusside, Triticum aestivum